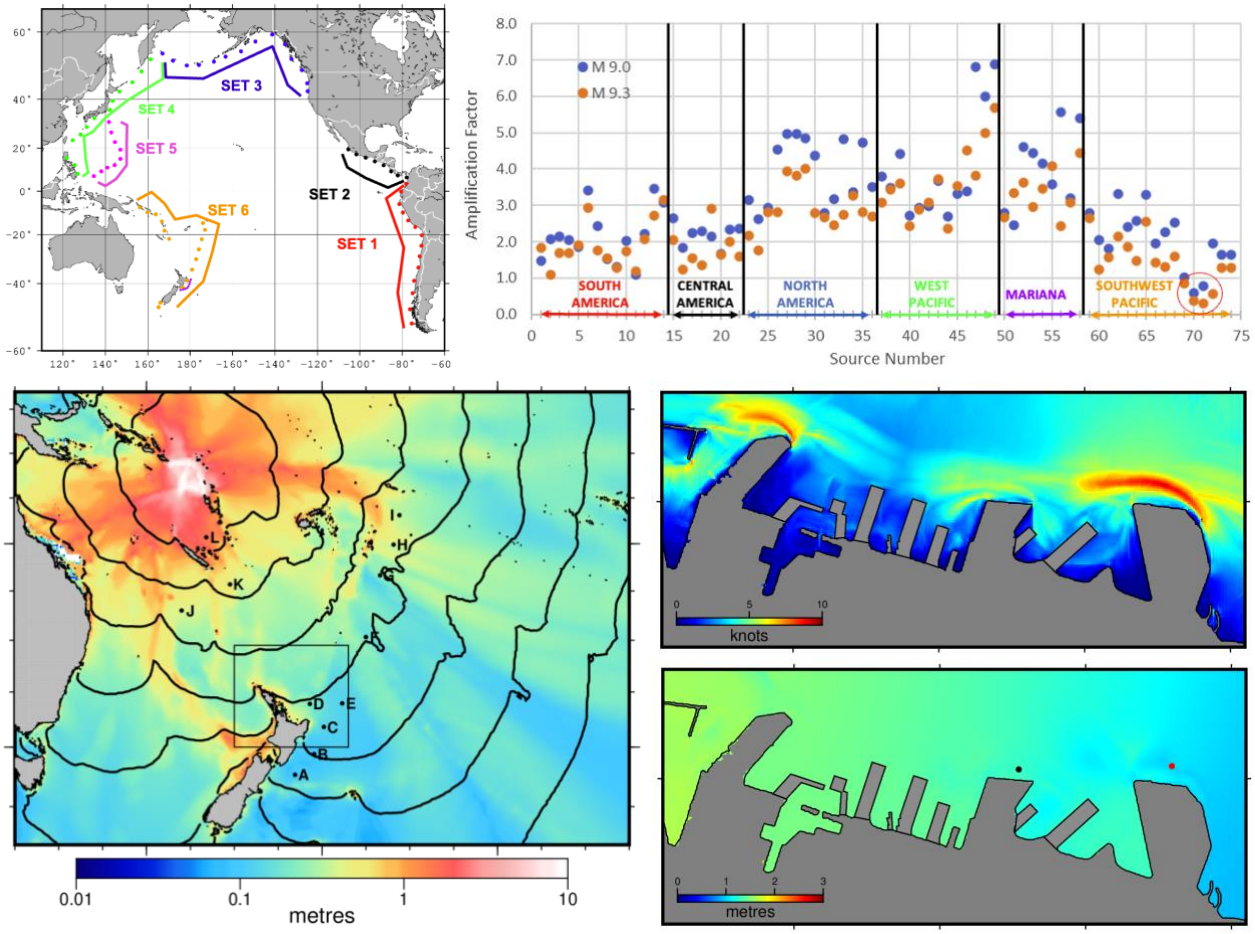
TSUNAMI INUNDATION ANALYSIS AND DEVELOPMENT OF TSUNAMI RESPONSE PLANS

PORTS OF AUCKLAND, NEW ZEALAND



(top left) Dots indicate the locations of the 73 tsunami sources used in the analysis **(top right)** tsunami amplitude amplification factor inside the port of Auckland for each source. **(bottom left)** regional propagation for a MW 9.2 earthquake tsunami source in the Solomon Islands **(bottom right)** Maximum computed current speed (top) and amplitude (bottom) for that source

PROJECT INFORMATION:

Location: Auckland, New Zealand

Client: Ports of Auckland

Project Date: 2022

SCOPE OF WORK:

- Review of historical tsunami events
- Tsunami source characterization
- High resolution numerical modelling of tsunami inundation and currents

PROJECT DESCRIPTION:

The objective of this study was to assess the tsunami hazard at Ports of Auckland through a detailed numerical modelling study. The study aimed to refine the understanding of tsunami effects in the port resulting from a wide range of distant, regional and near field tsunami sources and to put these results in context of existing probabilistic analyses. The project also developed a set of tsunami event 'playbooks' designed to assist in decision making and response activities during a tsunami event.

For the study we constructed a highly detailed bathymetric model of the port of Auckland and validated the numerical model against several historical tsunami events. The model was then used to simulated more than 140 separate tsunami events caused by hypothetical earthquakes located around the Pacific Rim. Additional scenarios were run for a wider range of earthquake magnitudes for sources located along the Tonga-Kermadec trench and in the southwestern Pacific. By computing a ratio of tsunami amplitudes at a point offshore to a point inside the port, we established an 'amplification factor' for tsunami waves as a function of source region. From this we noted that sources in the western Pacific were more strongly amplified as compared to sources in the near-field. However, the distant sources were of lower amplitude and at relatively low probability according to published probabilistic tsunami hazard models.